What is claimed is:

1. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along each of a length direction of said linear area of the stimulable phosphor sheet and a direction normal to said length direction, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from said length direction of said linear area of the stimulable phosphor sheet,

iv) successively reading outputs of said line sensor in accordance with said movement, and

v) performing operation processing on the outputs of said photoelectric conversion devices, which outputs have been obtained at respective positions of movement and correspond to an identical site on the stimulable phosphor sheet.

2. A method as defined in Claim 1 wherein said line sensor comprises a plurality of sensor chips arrayed in a straight line along said length direction of said linear area of the stimulable phosphor sheet.

3. A method as defined in Claim 1 wherein said line sensor comprises a plurality of sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

4. A method as defined in Claim 2 or 3 wherein each of said sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

5. A method as defined in Claim 1, 2, or 3 wherein said line light source is a broad area laser, which linearly radiates out the stimulating rays.

6. A method as defined in Claim 1, 2, or 3 wherein the linear stimulating rays are guided with stimulating ray guiding means to the area of the stimulable phosphor sheet,

the light, which is emitted by the stimulable

phosphor sheet, is guided with emitted light guiding means to said line sensor, and

at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

7. A method as defined in Claim 6 wherein at least part of optical elements, which constitute said stimulating ray guiding means, and at least part of optical elements, which constitute said emitted light guiding means, are utilized in common with each other.

8. A method as defined in Claim 1, 2, or 3 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

9. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation

image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

10. A method as defined in Claim 9 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

11. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said line sensor is shifted by sensor shifting means to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and

back surfaces of the stimulable phosphor sheet.

12. A method as defined in Claim 11 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

13. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, the front and back surfaces of the stimulable phosphor sheet are reversed by sheet reversing means, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

14. A method as defined in Claim 9 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

15. A method as defined in Claim 11 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray-reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

16. A method as defined in Claim 13 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

17. A method as defined in Claim 9 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

18. A method as defined in Claim 11 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor

overlap each other.

19. A method as defined in Claim 13 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

20. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

21. A method as defined in Claim 20 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

22. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said line sensor is shifted by sensor shifting means to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet,

and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

23. A method as defined in Claim 22 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

24. A method as defined in Claim 1, 2, or 3 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, the front and back surfaces of the stimulable phosphor sheet are reversed by sheet reversing means, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front

and back surfaces of the stimulable phosphor sheet, and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

25. A method as defined in Claim 20 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

26. A method as defined in Claim 22 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

27. A method as defined in Claim 24 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

28. A method as defined in Claim 20 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor

sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

29. A method as defined in Claim 22 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

30. A method as defined in Claim 24 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

31. A method as defined in Claim 1 wherein said area sensor is a back illuminated type of CCD image sensor.

32. A method as defined in Claim 31 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a straight line along said length direction of

said linear area of the stimulable phosphor sheet.

33. A method as defined in Claim 31 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

34. A method as defined in Claim 32 or 33 wherein each of said back illuminated type of CCD image sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

35. A method as defined in Claim 31, 32, or 33 wherein said back illuminated type of CCD image sensor is cooled with cooling means.

36. A method as defined in Claim 1, 2, or 3 wherein said line light source is constituted of an organic EL device.

37. A method as defined in Claim 1, 2, or 3 wherein the light, which is emitted by the stimulable phosphor sheet, is guided with light guiding optical system to the line sensor,

the stimulable phosphor sheet is moved with respect to said line light source, said light guiding optical system, and said line sensor and in the direction different from said length direction of said linear area of the stimulable phosphor sheet, and

said light guiding optical system has been

subjected to coloring for transmitting only the emitted light and filtering out the stimulating rays.

38. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) successively reading outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line light source is a broad area laser, which linearly radiates out the stimulating rays.

39. A radiation image read-out method, comprising the steps of:

i) linearly radiating stimulating rays, which have been produced by a line light source,

ii) guiding the linear stimulating rays to an area of a stimulable phosphor sheet, on which a radiation image has been stored, with stimulating ray guiding means, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

iii) guiding light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with emitted light guiding means to a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iv) receiving the emitted light with said line sensor, the received light being subjected to photoelectric conversion performed by said line sensor,

v) moving the stimulable phosphor sheet with

respect to said line light source and said line sensor and in a direction different from the length direction of said linear area of the stimulable phosphor sheet, and

vi) successively reading outputs of said line sensor in accordance with said movement,

wherein at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

40. A method as defined in Claim 39 wherein at least part of optical elements, which constitute said stimulating ray guiding means, and at least part of optical elements, which constitute said emitted light guiding means, are utilized in common with each other.

41. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the

linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from said length direction of said linear area of the stimulable phosphor sheet, and

iv) successively reading outputs of said line sensor in accordance with said movement,

wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

42. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable

phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal

components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

43. A method as defined in Claim 42 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

44. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which

outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said line sensor is shifted by sensor shifting means to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

45. A method as defined in Claim 44 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

46. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has

been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, the front and back surfaces of the stimulable phosphor sheet are reversed by sheet reversing means, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

operation processing is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

47. A method as defined in any of Claims 42 to 46 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

48. A method as defined in any of Claims 42 to 46 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

49. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation

image, from the front and back surfaces of the stimulable phosphor sheet, and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

50. A method as defined in Claim 49 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

51. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said line sensor is shifted by sensor shifting means to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and

back surfaces of the stimulable phosphor sheet.

52. A method as defined in Claim 51 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

53. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, the front and back surfaces of the stimulable phosphor sheet are reversed by sheet reversing means, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

a subtraction process is performed on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

54. A method as defined in any of Claims 49 to 53 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

55. A method as defined in any of Claims 49 to 53 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

56. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable

respect to said line light source, said light guiding optical system, and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet,

wherein said light guiding optical system has been subjected to coloring for transmitting only the emitted light and filtering out the stimulating rays.

62. A radiation image read-out method, comprising the steps of:

i) irradiating stimulating rays, which have been produced by a surface light source, onto a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the area of the front surface of the stimulable phosphor sheet exposed to the stimulating rays or from an area of a back surface of the stimulable phosphor sheet corresponding to said area of the front surface of the stimulable phosphor sheet, with an area sensor comprising a plurality of arrayed photoelectric conversion devices, the received light being subjected to photoelectric conversion performed by said area sensor, and

iii) reading outputs of said photoelectric

phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) successively reading outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line sensor is a back illuminated type of CCD image sensor.

57. A method as defined in Claim 56 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a straight line along said length direction of said linear area of the stimulable phosphor sheet.

58. A method as defined in Claim 56 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

59. A method as defined in Claim 56, 57, or 58 wherein said back illuminated type of CCD image sensor is cooled with cooling means.

60. A radiation image read-out method, comprising

the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet, the received light being subjected to photoelectric conversion performed by said line sensor,

iii) moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) successively reading outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line light source is constituted of an organic EL device.

61. A radiation image read-out method, comprising the steps of:

i) linearly irradiating stimulating rays, which have been produced by a line light source, onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) guiding light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, with light guiding optical system to a line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) receiving the emitted light with said line sensor, the received light being subjected to photoelectric conversion performed by said line sensor, and

iv) moving the stimulable phosphor sheet with

conversion devices constituting said area sensor,

wherein said area sensor is a back illuminated type of CCD image sensor.

63. A method as defined in Claim 62 wherein said back illuminated type of CCD image sensor comprises a plurality of arrayed back illuminated type of CCD image sensor chips.

64. A method as defined in Claim 63 wherein each of said back illuminated type of CCD image sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

65. A method as defined in Claim 62, 63, or 64 wherein said back illuminated type of CCD image sensor is cooled with cooling means.

66. A radiation image read-out method, comprising the steps of:

i) irradiating stimulating rays, which have been produced by a surface light source, onto a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) receiving light, which is emitted from the area of the front surface of the stimulable phosphor sheet exposed to the stimulating rays or from an area of a back

surface of the stimulable phosphor sheet corresponding to said area of the front surface of the stimulable phosphor sheet, with an area sensor comprising a plurality of arrayed photoelectric conversion devices, the received light being subjected to photoelectric conversion performed by said area sensor, and

iii) reading outputs of said photoelectric conversion devices constituting said area sensor,

wherein said surface light source is constituted of an organic EL device.

67. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line

sensor comprising a plurality of photoelectric conversion devices arrayed along each of a length direction of said linear area of the stimulable phosphor sheet and a direction normal to said length direction,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from said length direction of said linear area of the stimulable phosphor sheet, and

iv) reading means for successively reading outputs of said line sensor in accordance with said movement, said reading means being provided with operation means for performing operation processing on the outputs of said photoelectric conversion devices, which outputs have been obtained at respective positions of movement performed by said scanning means and correspond to an identical site on the stimulable phosphor sheet.

68. An apparatus as defined in Claim 67 wherein said line sensor comprises a plurality of sensor chips arrayed in a straight line along said length direction of said linear area of the stimulable phosphor sheet.

69. An apparatus as defined in Claim 67 wherein said line sensor comprises a plurality of sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

70. An apparatus as defined in Claim 68 or 69 wherein each of said sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

71. An apparatus as defined in Claim 67, 68, or 69 wherein said line light source is a broad area laser, which linearly radiates out the stimulating rays.

72. An apparatus as defined in Claim 67, 68, or 69 wherein the apparatus further comprises stimulating ray guiding means for guiding the linear stimulating rays to the area of the stimulable phosphor sheet, and emitted light guiding means for guiding the light, which is emitted from said linear area of the stimulable phosphor sheet, to said line sensor, and

at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

73. An apparatus as defined in Claim 72 wherein at least part of optical elements, which constitute said stimulating ray guiding means, and at least part of optical elements, which constitute said emitted light guiding means, are utilized in common with each other.

74. An apparatus as defined in Claim 67, 68, or

69 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

75. An apparatus as defined in Claim 67, 68, or 69 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

76. An apparatus as defined in Claim 75 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

77. An apparatus as defined in Claim 67, 68, or 69 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

the apparatus further comprises sensor shifting means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sensor shifting means shifts said line sensor to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

78. An apparatus as defined in Claim 77 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

79. An apparatus as defined in Claim 67, 68, or 69 wherein the stimulable phosphor sheet is capable of emitting light from the front and back surfaces,

the apparatus further comprises sheet reversing means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sheet reversing means

reverses the front and back surfaces of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

80. An apparatus as defined in Claim 75 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

81. An apparatus as defined in Claim 77 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

82. An apparatus as defined in Claim 79 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

83. An apparatus as defined in Claim 75 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

84. An apparatus as defined in Claim 77 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

85. An apparatus as defined in Claim 79 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

86. An apparatus as defined in Claim 67, 68, or

69 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

87. An apparatus as defined in Claim 86 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

88. An apparatus as defined in Claim 67, 68, or 69 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

the apparatus further comprises sensor shifting means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sensor shifting means shifts said line sensor to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

89. An apparatus as defined in Claim 88 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

90. An apparatus as defined in Claim 67, 68, or 69 wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from the front surface, and emitting light, which carries information of the other radiation image, from the back surface,

the apparatus further comprises sheet reversing means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sheet reversing means reverses the front and back surfaces of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for

performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

91. An apparatus as defined in Claim 86 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

92. An apparatus as defined in Claim 88 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

93. An apparatus as defined in Claim 90 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

94. An apparatus as defined in Claim 86 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the

emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

95. An apparatus as defined in Claim 88 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

96. An apparatus as defined in Claim 90 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

97. An apparatus as defined in Claim 67 wherein said area sensor is a back illuminated type of CCD image sensor.

98. An apparatus as defined in Claim 97 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a straight line along said length direction of

said linear area of the stimulable phosphor sheet.

99. An apparatus as defined in Claim 97 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

100. An apparatus as defined in Claim 98 or 99 wherein each of said back illuminated type of CCD image sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

101. An apparatus as defined in Claim 97, 98, or 99 wherein the apparatus further comprises cooling means for cooling said back illuminated type of CCD image sensor.

102. An apparatus as defined in Claim 67, 68, or 69 wherein said line light source is constituted of an organic EL device.

103. An apparatus as defined in Claim 67, 68, or 69 wherein the apparatus further comprises light guiding optical system for guiding the light, which is emitted by the stimulable phosphor sheet, to the line sensor,

said scanning means moves the stimulable phosphor sheet with respect to said line light source, said light guiding optical system, and said line sensor, and

said light guiding optical system has been subjected to coloring for transmitting only the emitted light

and filtering out the stimulating rays.

104. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) reading means for successively reading

outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line light source is a broad area laser, which linearly radiates out the stimulating rays.

105. A radiation image read-out apparatus, comprising:

i) a line light source for linearly radiating stimulating rays, which have been produced by a line light source,

ii) stimulating ray guiding means for guiding the linear stimulating rays to an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

iii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iv) emitted light guiding means for guiding the light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, to

said line sensor,

v) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from the length direction of said linear area of the stimulable phosphor sheet, and

vi) reading means for successively reading outputs of said line sensor in accordance with said movement,

wherein at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

106. An apparatus as defined in Claim 105 wherein at least part of optical elements, which constitute said stimulating ray guiding means, and at least part of optical elements, which constitute said emitted light guiding means, are utilized in common with each other.

107. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of

energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from said length direction of said linear area of the stimulable phosphor sheet, and

iv) reading means for successively reading outputs of said line sensor in accordance with said movement,

wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

108. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating

stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement performed by said scanning means,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of

image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

109. An apparatus as defined in Claim 108 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

110. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area

of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement performed by said scanning means,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

the apparatus further comprises sensor shifting means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sensor shifting means shifts said line sensor to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

111. An apparatus as defined in Claim 110 wherein

said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

112. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement performed by said scanning means,

wherein the stimulable phosphor sheet is capable of emitting light from front and back surfaces,

the apparatus further comprises sheet reversing means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sheet reversing means reverses the front and back surfaces of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means performs operation processing on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

113. An apparatus as defined in any of Claims 108 to 112 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

114. An apparatus as defined in any of Claims 108 to 112 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path

of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

115. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions

of movement performed by said scanning means,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

two line sensors are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet, said two line sensors detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

116. An apparatus as defined in Claim 115 wherein two line light sources are utilized, each of which is located on one of the front and back surface sides of the stimulable phosphor sheet.

117. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement performed by said scanning means,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed

with radiation having different energy distributions, the stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

the apparatus further comprises sensor shifting means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sensor shifting means shifts said line sensor to the opposite surface side of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

118. An apparatus as defined in Claim 117 wherein said sensor shifting means shifts both said line sensor and said line light source to the opposite surface side of the stimulable phosphor sheet.

119. A radiation image read-out apparatus,

comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the stimulable phosphor sheet exposed to the linear stimulating rays, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor, and

iv) reading means for reading outputs of said photoelectric conversion devices constituting said line sensor, which outputs are obtained at respective positions of movement performed by said scanning means,

wherein the stimulable phosphor sheet is a stimulable phosphor sheet for energy subtraction processing, which stores two radiation images of a single object formed with radiation having different energy distributions, the

stimulable phosphor sheet being capable of emitting light, which carries information of one of the two radiation images, from a front surface, and emitting light, which carries information of the other radiation image, from a back surface,

the apparatus further comprises sheet reversing means for operating such that, after detection of the emitted light from one of the front and back surfaces of the stimulable phosphor sheet has been finished, said sheet reversing means reverses the front and back surfaces of the stimulable phosphor sheet, said line sensor thereby detecting two image signals, each of which is made up of a series of image signal components representing pixels in the radiation image, from the front and back surfaces of the stimulable phosphor sheet, and

said reading means is provided with means for performing a subtraction process on image signal components of said two image signals, which image signal components represent corresponding pixels on the front and back surfaces of the stimulable phosphor sheet.

120. An apparatus as defined in any of Claims 115 to 119 wherein a light emission region of the stimulable phosphor sheet is partitioned by a stimulating ray reflecting partition member, which extends in a thickness direction of the stimulable phosphor sheet, into a plurality of fine cells.

121. An apparatus as defined in any of Claims 115

to 119 wherein, in cases where said line light source and said line sensor are located on the same surface side of the stimulable phosphor sheet, at least part of an optical path of the stimulating rays from said line light source to the stimulable phosphor sheet and at least part of an optical path of the emitted light from the stimulable phosphor sheet to said line sensor overlap each other.

122. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) reading means for successively reading outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line sensor is a back illuminated type of CCD image sensor.

123. An apparatus as defined in Claim 122 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a straight line along said length direction of said linear area of the stimulable phosphor sheet.

124. An apparatus as defined in Claim 122 wherein said back illuminated type of CCD image sensor comprises a plurality of back illuminated type of CCD image sensor chips arrayed in a zigzag pattern along said length direction of said linear area of the stimulable phosphor sheet.

125. An apparatus as defined in Claim 122, 123, or 124 wherein the apparatus further comprises cooling means for cooling said back illuminated type of CCD image sensor.

126. A radiation image read-out apparatus, comprising:

i) a line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) scanning means for moving the stimulable phosphor sheet with respect to said line light source and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet, and

iv) reading means for successively reading outputs of said photoelectric conversion devices of said line sensor in accordance with said movement,

wherein said line light source is constituted of

an organic EL device.

127. A radiation image read-out apparatus, comprising:

i) line light source for linearly irradiating stimulating rays onto an area of a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) a line sensor for receiving light, which is emitted from the linear area of the front surface of the stimulable phosphor sheet exposed to the linear stimulating rays or from a linear area of a back surface of the stimulable phosphor sheet corresponding to said linear area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said line sensor comprising a plurality of photoelectric conversion devices arrayed along a length direction of said linear area of the stimulable phosphor sheet,

iii) a light guiding optical system for guiding the emitted light, said light guiding optical system being located between the stimulable phosphor sheet and said line sensor, and

iv) scanning means for moving the stimulable phosphor sheet with respect to said line light source, said

light guiding optical system, and said line sensor and in a direction different from a length direction of said linear area of the stimulable phosphor sheet,

wherein said light guiding optical system has been subjected to coloring for transmitting only the emitted light and filtering out the stimulating rays.

128. A radiation image read-out apparatus, comprising:

i) a surface light source for irradiating stimulating rays onto a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) an area sensor for receiving light, which is emitted from the area of the front surface of the stimulable phosphor sheet exposed to the stimulating rays or from an area of a back surface of the stimulable phosphor sheet corresponding to said area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said area sensor comprising a plurality of arrayed photoelectric conversion devices, and

iii) reading means for reading outputs of said photoelectric conversion devices constituting said area sensor,

wherein said area sensor is a back illuminated type of CCD image sensor.

129. An apparatus as defined in Claim 128 wherein said back illuminated type of CCD image sensor comprises a plurality of arrayed back illuminated type of CCD image sensor chips.

130. An apparatus as defined in Claim 129 wherein each of said back illuminated type of CCD image sensor chips comprises a plurality of photoelectric conversion devices arrayed in two-dimensional directions.

131. An apparatus as defined in Claim 128, 129, or 130 wherein the apparatus further comprises cooling means for cooling said back illuminated type of CCD image sensor.

132. A radiation image read-out apparatus, comprising:

i) a surface light source for irradiating stimulating rays onto a front surface of a stimulable phosphor sheet, on which a radiation image has been stored, the stimulating rays causing the stimulable phosphor sheet to emit light in proportion to an amount of energy stored thereon during its exposure to radiation,

ii) an area sensor for receiving light, which is emitted from the area of the front surface of the stimulable phosphor sheet exposed to the stimulating rays or from an area of a back surface of the stimulable phosphor sheet

corresponding to said area of the front surface of the stimulable phosphor sheet, and performing photoelectric conversion of the received light, said area sensor comprising a plurality of arrayed photoelectric conversion devices, and

iii) reading means for reading outputs of said photoelectric conversion devices constituting said area sensor,

wherein said surface light source is constituted of an organic EL device.